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Efficient context-based entropy coding for lossy wavelet image compression

[Chrysafis, C.](#), [Ortega, A.](#)

Integrated Media Syst. Center, Univ. of Southern California, Los Angeles, CA, USA;

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Abstract

We present an adaptive image coding algorithm based on novel backward-adaptive quantization/classification technique and a uniform scalar quantizer to quantize the image subbands. Our algorithm puts the coefficient into one of several classes based on values of neighboring previously quantized coefficients. These previously quantized coefficients form contexts which are used to model the subband data. To each context type corresponds a different probability model and thus each subband coefficient is encoded using an arithmetic coder having the appropriate model depending on that coefficient's neighborhood. We show how the context is driven by rate-distortion criteria, by choosing the contexts in a way that the total distortion for a given bit rate is minimized. Probability models for each context are initialized/updated in a very efficient way so that practically no overhead information is required by the decoder. Our results are comparable or in some cases better than the recent state of the art, with our algorithm being more efficient than the published algorithms of comparable performance.

Index Terms

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